

1. (TWICE AMENDED) A fluid pump comprising:

an elastic bladder, at least a portion of the interior surface area of said bladder being changeable between a contracted state have a first surface area and an expanded state having a second surface area that is substantially greater than said first surface area, said bladder having a fluid inlet and a fluid outlet;

means for causing substantially one-way fluid flow through said bladder;

B1 a housing around at least a portion of said bladder, an annular volume being defined in the space between said housing and said bladder, said annular volume being occupied by a driving fluid;

means for changing the pressure of said driving fluid in said annular volume to alternately expand and contract said bladder to change the interior surface area and volume of said bladder; and

a fluid flow regulating means in said annular volume between said bladder and said housing for expanding and contracting selected areas of said bladder adapted, in a filling phase, to expand a selected area of said bladder adjacent said inlet and thereafter progressively expand the remaining areas of said bladder towards said bladder outlet, and during an ejection phase, to initially contract said bladder adjacent said bladder inlet and thereafter progressively contract the remaining areas of the bladder towards said bladder outlet.

110
7.1 (TWICE AMENDED) A fluid pump comprising, an elastic bladder, at least a portion of the interior surface area of said bladder being changeable between a contracted state having a first surface area and an expanded state having a second surface area that is substantially greater than said first surface area, said bladder having a fluid inlet and a fluid outlet;

a housing around at least a portion of said bladder and defining a space between said housing and said bladder for receiving a bladder actuating fluid;

B₂
means for alternately increasing and decreasing the pressure of said actuating fluid for alternately expanding and contracting said bladder to change the interior surface area and volume of said bladder;

means for causing substantially one-way fluid flow through said bladder; and

wherein said bladder and said actuating fluid are a unitary body of semisolid material, the surface of said semisolid material functioning as said bladder interior surface.

24. 6
7.1 (TWICE AMENDED) A blood pump as in claim 15, further comprising at least one extensible strut spanning the interior of said bladder.

~~31.1~~ (AMENDED) A method of pumping blood in the circulatory system of a human in need thereof comprising the steps of

(a) providing a blood pumping system having an extensible and contractible bladder, said pumping system having an inlet and an outlet;

(b) connecting the inlet and outlet of said pumping system to the human's circulatory system;

B₂
cont
(c) expanding a majority of the interior surface area of said pumping system by at least a few percent, including expanding the volume of the bladder to draw blood into the bladder through the inlet;

(d) contracting a majority of the interior surface area of said blood pumping system by at least a few percent, including contracting the volume of the bladder to pump blood out of the outlet of said system; and

(e) rhythmically repeating steps (c) and (d).

112
32. (AMENDED) A fluid pump comprising:

B₂
a bladder, at least a portion of the interior surface area of said bladder being changeable, said bladder having a fluid inlet and a fluid outlet, said bladder having thickness variations for controlling the expansion and contraction of said bladder, said bladder have a thinner wall thickness at said inlet and a thicker wall thickness at said outlet;

means for alternately expanding and contracting said bladder to change the interior surface area and volume of said bladder; and

means for causing substantially one-way fluid flow through said bladder.

115
35. (AMENDED) A fluid pump comprising:

a housing;

an extensible and contractible bladder in said housing, a space defined between said housing and said bladder for receiving a bladder driving fluid, said bladder having an inlet and an outlet;

a check valve to at least one of said bladder inlet and outlet;

means for altering the pressure of the driving fluid to alternately expand and contract the interior surface area and volume of said bladder to define

a pumping cycle, most of said interior surface area of said bladder adapted to expand and contract with each said pumping cycle; and

a fluid pressure regulator in said space to selectively control the rate of expansion or contraction of selected areas of said bladder.

B₂
22
~~42~~ (AMENDED) A fluid pump comprising:

a bladder, at least a portion of the interior surface area of said bladder being changeable, said bladder having a fluid inlet and a fluid outlet;

means for alternately expanding and contracting the bladder to change the interior surface area and volume of said bladder;

means for causing substantially one-way fluid flow through said bladder; and

wherein said bladder is comprised of a plurality of different materials to control the rate of expansion or contraction of selected areas of said bladder.

119
~~43~~ (NEW) A method of for reducing the formation of blood clots during blood pumping as in claim ~~38~~ *37*, wherein step of changing the interior surface area of said bladder includes changing a majority of the interior surface area of said pump.

²⁰
44. (NEW) A method of for reducing the formation of blood clots during blood pumping as in claim ~~38~~¹⁷, wherein said stretching step is a filling phase comprising expanding a selected area of said bladder adjacent said inlet and thereafter progressively expanding the remaining areas of said bladder towards said bladder outlet; and said contracting step is an ejection phase, comprising initially contracting said bladder adjacent said inlet and thereafter progressively contracting the remaining areas of said bladder towards said outlet.

B₂
²¹
45. (NEW) A method of for reducing the formation of blood clots during blood pumping as in claim ~~38~~¹⁷, wherein said bladder is has a curved configuration representative of a natural heart with said inlet being adjacent said outlet, and wherein said steps of elastically expanding and contracting said bladder comprises milking the blood through said bladder in a smooth flow substantially free from areas of turbulence and areas of stagnation.

¹⁴
46. (NEW) A fluid pump as in claim ~~35~~¹⁵ for pumping blood, wherein said bladder is has a curved configuration representative of a natural heart with said inlet being adjacent said outlet.